UNITED STATES PATENT APPLICATION

FOR

Method and Apparatus for Bookmarking Telephone Numbers for Efficient Access
by Wireless Phone Devices

INVENTORS:

Siew Shon Seet
Lawrence M. Stein
Paul A. Smethers
Andrew L. Laursen
Bruce K. Martin, Jr.

Prepared by:

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CALIFORNIA 90025
(408) 720-8300

Attorney's Docket No. 3399P015XC

Method and Apparatus for Bookmarking Telephone Numbers for Efficient Access by Wireless Phone Devices

[0001]   This application is a continuation of U.S. Patent application no.

09/161,103, filed on September 25, 1998 and entitled, "Method and Apparatus

for Bookmarking Telephone Numbers for Efficient Access by Wireless Phone

Devices," which is a continuation-in-part of U.S. Patent application no.

08/987,346, filed on December 9, 1997, U.S. Patent no. 6,065,120, entitled

"Method and System for Self-Provisioning a Rendezvous to Ensure Secure

Access to Information in a Database from Multiple Devices," each of which is

incorporated herein by reference.

FIELD OF THE INVENTION

[0002]   The present invention relates to the field of wireless communication

systems. In particular the present invention discloses a method and apparatus of

bookmarking telephone numbers in a server based bookmark database for

efficient access by wireless client devices.

BACKGROUND OF THE INVENTION

[0003]   One of the most pressing problems facing wireless phone

manufacturers is providing an easy-to-use user interface for wireless phone

users. For example, one problem is how to facilitate an efficient entry of a long

telephone number and place a call.

[0004]   One technique that manufacturers provide is memory dialing. A wireless phone device is provided with a memory to store a number of telephone numbers by a user. Each of the numbers can be accessed through a numeric key in the phone keypad. For example, pressing "#" key and "1" key bring up a number stored in the memory and dial the number automatically. One problem with the memory dialing is a requirement on the user to remember all of the keys, each of the keys corresponding to a name. The requirement basically limits the number of telephone numbers that can be stored in the memory, as no users would be willing to remember many keys. Therefore, there is a great need for a generic solution that provides a user to view a list of names before selecting a number to dial. In addition, it is generally noted that it is difficult to update the telephone numbers in the memory. There is further a need for a solution that provides the user with efficient means to update a telephone list.

SUMMARY OF THE INVENTION

[0005]   The present invention has been made in consideration of the above described problems and needs and has particular applications to the storing and retrieving telephone numbers in a single server based database that is accessible to wireless client devices and Internet web clients. The wireless client devices may include, but are not limited to, mobile computing devices, cellular phones, palm-sized computer devices, personal digital assistant devices and Internet-capable appliance remote controllers, and are capable of communicating wirelessly with the database server and making a phone call through a wireless network.

[0006]   The present invention includes a uniform bookmark that stores telephone numbers in a database. The database may include other information accessible by the wireless client device. Furthermore, the database can be accessed from any Internet client device such that a user may update his/her phone bookmark list from a web client device coupled to the Internet. One of the benefits and advantages of the present invention is that other applications can interact with the server based bookmark database across the Internet such that third party programs may synchronize with the telephone's bookmark database. Another advantage of the present invention is that the telephone bookmark database can be accessed using a one touch accelerated dialing list.

[0007]   Accordingly, one of the objects of the present invention is to provide a method and system for managing a phone bookmark for a wireless client device

to access and allowing a user to visually view a name associated with a phone number prior to dialing the number.

[0008]   Other objects, together with the foregoing are attained in the exercise of the invention in the following description and resulting in the embodiment illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

[0010] Figure 1 illustrates a schematic configuration in which the present invention may be practiced.

[0011] Figure 2 illustrates a functional diagram of an Internet proxy system for wireless client devices wherein unique identification is needed.

[0012] Figure 3 illustrates a flow diagram that describes how a wireless client accesses information from a client information database on a server.

[0013] Figure 4A illustrates a wireless client device displaying a list of applications or databases that may be accessed.

[0014] Figure 4B illustrates a wireless client device displaying the beginning of a list of bookmarks that may be accessed.

[0015] Figure 4C illustrates a wireless client device displaying additional listings of bookmarks that may be accessed.

[0016] Figure 4D illustrates a wireless client device requesting an optional area code when a seven digit number is to be dialed and area code prompting is on.

[0017] Figure 4E illustrates a wireless client device requesting a name for a new telephone bookmark to be created.

[0018] Figure 4F illustrates a wireless client device confirming the name of a new telephone bookmark that was just created.

[0019] Figure 4G illustrates a wireless client device displaying additional listings of bookmarks that may be accessed including a newly created bookmark.

[0020] Figure 4H illustrates a wireless client device displaying a submenu for creating a new telephone bookmark, creating a new web site bookmark, or deleting an existing bookmark.

[0021] Figure 4I illustrates a wireless client device prompting for a name of a new telephone bookmark to be created.

[0022] Figure 4J illustrates a wireless client device displaying a name for a new telephone bookmark to be created.

[0023] Figure 4K illustrates a wireless client device prompting for a telephone number of a new telephone bookmark to be created.

[0024] Figure 4L illustrates a wireless client device confirming the name of a new telephone bookmark that was just created.

[0025] Figure 4M illustrates a wireless client device displaying additional listings of bookmarks that may be accessed including a newly created bookmark.

[0026] Figure 4N illustrates a wireless client device requesting if a preceding "1" should be dialed for a ten digit number to be dialed.

[0027] Figure 5 illustrates a flow diagram that describes how a web client accesses information from a client information database on a server using a web server database access program.

[0028] Figure 6A illustrates a web client displaying the same list of web site and telephone number bookmarks that are depicted in Figure 4B and 4C.

[0029] Figure 6B illustrates a web client displaying the list of web site and telephone number bookmarks of Figure 6A wherein a new telephone bookmark has been added to the list.

DETAILED DESCRIPTION OF THE INVENTION

Notation and Nomenclature

[0030]   In the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to those skilled in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention.

[0031]   The detailed description of the present invention in the following is presented largely in terms of procedures, steps, logic blocks, processing, and other symbolic representations that resemble data processing devices coupled to networks. These process descriptions and representations are the means used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. The method of the present invention along with the apparatus to be described in detail below is a self-consistent sequence of processes or steps leading to a desired result. These steps or processes are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities may take the form of electrical signals capable of being stored, transferred, combined, compared, displayed and otherwise manipulated in a computer system or electronic computing devices. It proves convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols,

8

operations, messages, terms, numbers, or the like. It should be borne in mind that all of these similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following description, it is appreciated that throughout the present invention, discussions utilizing terms such as "processing" or "computing" or "verifying" or "displaying" or the like, refer to the actions and processes of a computing device that manipulates and transforms data represented as physical quantities within the computing device's registers and memories into other data similarly represented as physical quantities within the computing device or other electronic devices.

A Wireless Data Network

[0032]   Refer now to the drawings, in which like numerals refer to like parts throughout the several views. Figure 1 illustrates a schematic configuration in which the present invention may be practiced. A data network 100 comprises an airnet 102 that is generally called wireless network and a landnet 104 that is generally a landline network, each acting as a communication medium for data transmission therethrough. Airnet 102, in which the data transmission is via the air, is sometimes referred to as a carrier network as well because each airnet is controlled and operated by a carrier, for example AT&T and GTE, each having its own communication scheme, such as CDPD, CDMA, GSM and TDMA for airnet 102. The airnet 102 may comprise more than one different types of wireless network. For example, the airnet 102 may comprise a GSM wireless network for

some wireless client devices and a CDPD wireless network for other wireless client devices.

[0033]   Referenced by 106 is one of the two-way interactive communication devices, alternatively referred to wireless client devices herein, that can be a mobile device, a cellular phone, a wireless personal digital assistant, or a wireless capable remote controller, capable of communicating, via airnet 102, with an antenna 108 that also represents a carrier infrastructure. It is generally understood that the carrier infrastructure or antenna 108 serves simultaneously a plurality of the two-way interactive communication devices, of which only one mobile device 106 is shown in the figure. Similarly, connected to Internet 104 are a plurality of desktop personal computers (PC) 110 and a number of information server computers 112 (such as web servers), though only one representative, respectively, is shown in the figure. Personal computer system 110, as shown in the figure, may be an Intel processor based personal computer from Dell Computer, Inc. The personal computer system can execute an HTML Web browser, such as the Netscape Navigator, in order to communicate via the Internet 104 using HTTP to access information stored in information server 112 that may be a workstation from Sun Microsystems Inc. It is understood to those skilled in the art that personal computer 110 can store accessible information therein so as to become a information server as well.

[0034]   Between the Internet 104 and the airnet 102 there is a link infrastructure that comprises a proxy server device 114 and one or more wireless carrier infrastructures 108. The proxy server device 114, also referred to as proxy

server or wireless data server or gateway server, may be a workstation or a personal computer and performs mapping or translation functions. For example, the proxy server may map from one network protocol to another network protocol. Using the proxy server 114, a mobile device 106 may communicate with any one of the computer servers 112 or the personal computers 110 on the Internet via the wireless carrier infrastructure 108. The proxy server 114 may host many other applications that may be used by mobile devices and computer coupled to the Internet 104.

[0035]   The wireless carrier infrastructure 108 generally comprises a base station and an operation center for each type of wireless network supported. The base station controls radio or telecommunication links with the mobile devices. The operation and maintenance center comprises a mobile switching center performing the switching of calls between the mobile devices and other fixed or mobile network users. Further, the operation and maintenance center manages mobile services, such as authentication and oversees the proper operation and setup of a wireless network. Each of the hardware components and processes in the base station and the operation and maintenance center for each type of wireless network is known to those skilled in the art and not to be described herein to avoid unnecessarily obscuring aspects of the present invention.

[0036]   The communication protocol of the World Wide Web (WWW) on the Internet 104 is the well known HyperText Transport Protocol (HTTP) or HTTPS, a secure version of HTTP. HTTP runs on top of the Transport Control Protocol (TCP) and the Internet Protocol (IP). HTTP is used to transfer information in the

forms such as HTML and HDML between the proxy server 114 and one the HTML web servers that reside in the computers 110, 112, or 122.

[0037]   The communication protocol between mobile computing device 106 and proxy server 114 via airnet 102 is typically a wireless communication protocol that may be Handheld Device Transport Protocol (HDTP) according to one embodiment. HDTP, which preferably runs on User Datagram Protocol (UDP) is used to control the connection of a micro-browser in mobile device 106 to proxy server 114. The micro-browser, compared to an HTML browser, takes much less memory and demands less computing power. According to one embodiment of the present invention, the micro-browser is from Openwave Systems Inc. located at 1400 Seaport Boulevard, Redwood City, CA 94063 and primarily processes markup languages specific to wireless client devices and the characteristics of the wireless network. Some of these markup languages may include Handheld Device Markup Language, compact Hypertext Markup Language and Wireless Markup Language.

[0038]   To facilitate the description of the present invention, the micro-browser from Openwave Systems Inc. and Handheld Device Markup Language are used in one embodiment. Handheld Device Markup Language (HDML) is a tag based document language and comprises a set of commands or statements specified in a card that specifies how information is to be displayed on a small screen of the mobile device 106. Normally a number of cards are grouped into a deck that is the smallest unit of HDML information that can be exchanged between the mobile device 106 and the proxy server 114. The specifications of HDTP,

entitled "HDTP Specification" and HDML, entitled "HDML 2.0 Language Reference" are enclosed and incorporated herein by reference in their entirety.

[0039]   HDTP is a session-level protocol that resembles HTTP, but incurs less overhead since HDTP uses UDP instead of TCP. HDTP is highly optimized for use in thin client devices, such as the wireless client devices that typically have much less computing power and memory than provided in a laptop computer. Further, it is understood to those skilled in the art that UDP does not require a connection to be negotiated between a client and a server before information can be exchanged. Thus, using UDP eliminates the need of exchanging a large number of packets during a session creation between a client and a server. Exchanging a very small number of packets is one of the desired features for a wireless client device with very limited computing power and memory in order to effectively interact with a landline device.

A Wireless Computing Device

[0040]   To facilitate the description of the disclosed system, some of the features in mobile computing device 106 are recited. According to one embodiment, mobile computing device 106 is a mobile phone. Mobile phone 106 comprises a display screen 116 and a keyboard pad 118 that allow a user thereof to communicate interactively with the mobile phone. The digital hardware components including a microcontroller, a ROM, and RAM in mobile phone 106 are known to those skilled in the art.

[0041]   Compiled and linked processes of the disclosed system are typically

stored in the ROM as a client module that causes mobile device 106 to

communicate with proxy server 114. With display screen 116 and keypad 118, a

user of mobile device 106 can interactively communicate with proxy server 114

over airnet 102. Upon activation of a predetermined key sequence utilizing

keypad 118, for example, the microcontroller initiates a communication session

request to proxy server 114 using the client module in the ROM. Upon

establishing the communication session, mobile device 106 typically receives a

single HDML deck from proxy server 114 and stores the deck as cached in the

RAM. As described above, an HDML deck comprises one or more cards. Each

card includes the information required to generate a screen display on display

screen 116. The number of cards in a card deck is selected to facilitate efficient

use of the resources in mobile device 106 and in airnet network 102.

Internet Proxy For A Wireless Data Network

[0042]   Referring now to Figure 2, there is shown a functional block diagram of

a proxy system 214 for multiple wireless devices. Proxy system 214 may

correspond to link device 114 of Figure 1. Web server devices 202 and 207

provide information accessible to other computing devices on the Internet 104. A

first wireless mobile device 106 and a second wireless mobile device 107 access

the information in the web server devices 202 and 207 coupled to the Internet via

Internet proxy server device 114 through first wireless network 102. The actual

Internet communication and translation is performed by proxy process 217.

Proxy process 217 uses an IP address for communicating with other devices on the Internet. Figure 2 further illustrates a third wireless mobile device 176 and fourth wireless mobile device 177 that access the information in web server devices 202 and 207 via proxy server device 114 through a second wireless network 172 that has different properties than the first wireless network 102. Thus, proxy process 217 is responsible for communicating with several wireless clients that communicate using different wireless infrastructures.

[0043]   Each server device, such as web server devices 202 and 207 and proxy server device 114, refers to a piece of hardware equipment that comprises one or more microprocessors, working memory, buses and necessary interface and other components that are familiar to those skilled in the art while a server module means compiled and linked processes of the disclosed system loaded into the working memory to perform designated functions, according to the invention, through the parts and components in the server device. Additional details on the design, construction, and operation of one possible proxy server embodiment are described in commonly assigned U.S. Patent application no. 08/978,701, entitled "Method and Architecture for an Interactive Two-way Data Communication Network" by Alain Rossmann, filed on December 11, 1995, and U.S. Patent application no. 09/070,668, entitled "Method and Apparatus for Providing Network Access over Different Wireless Networks", by S. Ramasubramani, et al, filed on April 30, 1998, which are incorporated herein by reference in their entirety.

Client Bookmark Information Database

[0044] To store client specific information, the present invention includes a unified client bookmark information database 210. The database is accessed using database module 212. In one embodiment, the unified client bookmark information database 210 and database module 212 are implemented as an SQL database with SQL database software that can be obtained from Oracle Corporation of Redwood Shores, California. The unified client bookmark information database 210 may be stored in the proxy server 214 or in any other computer system that is accessible to the proxy server 214 across a data network.

[0045] The unified client bookmark database 210 is designed to store both Internet Uniform Resource Locators (URLs) and telephone numbers (hence the adjective "unified"). In the preferred SQL database embodiment, Table 1 that follows lists one possible database schema that may be used to store the telephone number bookmarks and other bookmarks:

Table 1 - Bookmark Database Schema

Name	Null?	Variable Type
SUB_NO	Not Null	VARCHAR2(128)
ORDINAL	Not Null	NUMBER(38)
NAMEe	Not Null	VARCHAR2(54)
POSITION	Not Null	NUMBER(38)
URL		VARCHAR(1536)
VARS		VARCHAR(1536)
PARENT	Not Null	NUMBER(38)

[0046]   Referring back to Figure 2, the unified client bookmark information database 210 and database module 212 can be accessed from at least two different sources: a web server based database access module 215 and wireless client database access module 219. The web server based database access module 215 allows web client devices with proper authority to access the unified client bookmark information database 210 through the database module 212. Similarly, the wireless client database access module 219 allows wireless clients to access the client database 210 through the database module 212.

Wireless Client Database Access

[0047]   The wireless client database access module 219 is used to allow wireless clients to access an online database of wireless information. Specifically, the wireless client database access module 219 performs all the

translations needed to convert requests received from wireless clients into properly formatted database requests and then create properly formatted responses to send back to the requesting wireless clients once the database has responded. The general description of the task that the wireless client database access module 219 must provide is set forth in Figure 3.

[0048]   Referring to step 310 of Figure 3, a wireless client device sends a database request to the server. The request may specify the retrieval of data, the storage of data, or any other typical database function. In the embodiment of Figure 2, the request is formatted in HDML and sent with HDTP. Wireless client database access module 219 then processes the request at step 320 to generate a properly formatted database request. In a preferred embodiment, wireless client database access module 219 creates an SQL database request. Wireless client database access module 219 sends the SQL database request to database module 210 at step 330.

[0049]   Database module 210 processes the request and provides a response back to wireless client database access module 219 at step 340. The database request may be any database operation such as fetching or storing data. Then, at step 350, wireless client database access module 219 formats the response received from the database 210 into a response for the wireless client device. In the preferred embodiment, the received information is formatted into one or more HDML cards. The formatted response is then sent back to the wireless client device. In the preferred embodiment, the wireless client database access

module sends the formatted HDML cards to the wireless client device using HDTP over the wireless network.

[0050]   Finally, at step 360, the wireless client device displays the formatted response from the wireless client database access module. The response may be information that was retrieved from the database 210 or a status response from a store data operation.

[0051]   To illustrate how the wireless client device user sees a database access, Figures 4A through 4N show a sequence of screen displays, according to one embodiment of the present invention, displaying the database transaction to the user. Referring to Figure 4A, the wireless client device displays a list of databases or applications that may be accessed. In Figure 4A, the currently displayed options include a Calendar 403, a list of To-Do items 404, and a collection of Bookmarks 405.

[0052]   Below the list of options is a row of soft key definitions: OK 406, Inbox 407, and Phone 408. The soft key definitions specify the actions that the three programmable soft key buttons respectively perform. Specifically, the programmable soft key button beneath the OK 406 soft key definition selects the item currently highlighted by the cursor 401, the programmable soft key button beneath the Inbox 407 soft key definition activates the user's mailbox, and the programmable soft key button beneath the Phone 408 soft key definition activates the phones telephone functions.

[0053]   The Bookmarks 405 contains a set of combined Internet Uniform Resource Locator (URL) bookmarks and telephone number bookmarks. In

Figure 4A, the user's cursor 401 is on Bookmarks 405 such that if the user selects the leftmost soft key, the Bookmarks will be accessed.

[0054]   Figure 4B illustrates how the wireless client device appears after the bookmarks item from Figure 4A is selected. In Figure 4B, a Bookmarks title line 410 along with two of the first bookmarks. The first two bookmarks 411 and 412 are for phone numbers such that a name and a phone number are displayed. Note that since the cursor is on a phone number bookmark, one of the soft key definitions is a Call function that will call the highlighted number.

[0055]   All the information in a bookmark list will usually not fit on a single screen such that the user can scroll down to reveal more listings as illustrate in Figure 4C. The continued list of Figure 4C contains two web sites: Unwired Planet 423 and Web Sites 425. The continued list of Figure 4C also contains a folder, Folder1 424. The Folder1 424 item represents another list of web site bookmarks, telephone bookmarks, and folders.

[0056]   To dial a phone number in a bookmark list, the user of the wireless client device may simply select the call soft key when the cursor is on the desired listing. For example, referring back to Figure 4A, if the user selects the Call soft key while the cursor is on the Shon phone listing 411, then the wireless client device will dial the associated phone number. In one embodiment, the wireless client device has an area code prompting setting. If the area code prompting setting is on, then the wireless client device will prompt for an area code for the phone number, as illustrated in Figure 4D, when the phone listing contains a seven digit telephone number. The user may enter an area code or simply press

the OK soft key to dial the phone number using only seven digits. If the area code prompting setting is off, then the wireless client device will simply dial the seven digit telephone number.

[0057] To simplify the dialing of telephone numbers, the present invention presents a one-touch unified accelerated bookmark access feature. In one embodiment, the unified accelerated bookmark access feature operates by dialing the corresponding bookmark in the bookmark list of a key that is held down for a predetermined time such as one second. If the corresponding bookmark contains a URL, then the corresponding data at the indicated URL is accessed using the wireless client device's browser. If the corresponding bookmark contains a telephone number, then the telephone number is immediately dialed. For example, referring to Figure 4C, if the user presses and holds the "3" key for a predetermined amount of time, then the wireless client device will automatically access the Unwired Planet web site. This feature can be used to access phone numbers that are often called or web sites that are repeatedly accessed such as news or stock web sites. Thus, the present invention allows both commonly accessed telephone numbers and URLs to be accessed by the press of a single key using a simple one-touch accelerated bookmark access feature.

[0058] When dialing a number from a contact database, an accelerated dialing key, the bookmark database, or from the wireless client device's digit pad, the user can bookmark the dialed number. For example, in Figure 4D the right most soft key is defined as "Mark". By selecting the Mark soft key, the wireless client

21

device proceeds to a display where the user is prompted for a telephone bookmark name as illustrated in Figure 4E. In Figure 4E, the bookmark name "Dial 555-1212" is entered.

[0059]   The user saves the bookmark name by selecting the Save soft key. Figure 4F illustrates the confirmation display that is presented after the Save soft key from Figure 4E is selected. After the new bookmark has been saved, the new bookmark will be available in the bookmark list. Figure 4G illustrates the new bookmark at the bottom of the bookmark list.

[0060]   The bookmark list can be edited using the bookmark editing menu. Referring to Figure 4G, a MENU soft key is displayed when the bookmark list is presented and the cursor is on a telephone bookmark or a URL bookmark. When the MENU soft key is selected, a context sensitive editing menu will be displayed. For example, when the cursor is on a URL bookmark when the MENU soft key is selected, then the URL bookmark editing menu is displayed. The URL bookmark editing menu gives the user the options of adding a phone number bookmark, adding a URL bookmark, or deleting the bookmark that was displayed when the MENU soft key was selected.

[0061]   When the MENU soft key is selected when a the cursor is on a telephone bookmark, the telephone bookmark editing menu is displayed as illustrated in Figure 4H. The telephone bookmark editing menu provides options such as Add Phone Number 481, Add Bookmark 482, Delete 483, and Edit (not shown, the Edit option is displayed when the user scrolls down). The Add Phone Number 481 and Add Bookmark 482 options allow new phone numbers and web

22

site URL bookmarks to be added respectively. The Delete 483 option will delete the telephone bookmark that was selected when the MENU button was pressed. For example, if the telephone bookmark editing menu of Figure 4H was entered from the screen of Figure 4G where the Dial555-1212 phone number bookmark 478 was highlighted by the cursor, then that Dial555-1212 phone number bookmark 478 would be deleted if the Delete option 483 was selected in Figure 4H.

[0062]   If the Add Phone Number 481 option is selected from the telephone bookmark editing menu of Figure 4H then the user will be prompted for a phone bookmark name as illustrated in Figure 4I. The user enters a name by pressing the keypad keys with the appropriate letter. To enter the second letter, the keypad key is hit twice and to enter the third letter, the key is pressed three times. For example, to enter "F" the "3" key is pressed three times. Figure 4J illustrates the screen display after the "5" key was pressed one time, the "6" key was pressed three times, the "4" key was pressed two times, and the "6" key was pressed two times to enter the name "john". To enter the name, the user selects the OK soft key in Figure 4J. Next, the user must enter the phone number. The entering of a phone number is illustrated in Figure 4K. After pressing the OK soft key after entering the number, a telephone bookmark entry confirmation page is displayed as illustrated in Figure 4L. The new bookmark will then be displayed in the bookmark list as illustrated in Figure 4M.

[0063]   The wireless client device of the present invention may respond differently to phone numbers that have different numbers of digits. For example,

as previously set forth, the wireless client device may request an area code if a seven-digit number is presented. A further prompting setting will cause the wireless client device to request if the number should be dialed with a preceding "1" that signifies a long distance number when a ten digit number is presented. For example, if a user instructs the wireless client device to dial Danny's number as illustrated in Figure 4B, then the wireless client device will prompt the user with the option of dialing the number with an added "1" as illustrated in Figure 4N.

[0064]   In a preferred embodiment, there is a setting for "always prompt" or "always dial". When the setting is set to "always prompt" then seven digits numbers always cause the wireless device to prompt for an area code and other than seven digit numbers always ask if a preceding "1" digit should be added. In the "always dial" mode, the phone number is simply dialed as is.

Web Client Database Access

[0065]   Referring back to Figure 2, the user of a wireless client device may also access the client database 210 and the database module 212 by using a standard World Wide Web browsing program such as Netscape Browser from Netscape Communications Inc. in Mountain View of California. To provide authorized access to client database 210 and database module 212 from a computer operating a web browser, the server 114 includes Web Server Database Access Module 215. Web server based database access module 215 typically receives a database request from an authorized web client and relays the request to the database module 212 and the client database 210. One

24

example of a commercial product that may be used to help build the web server

based database access module 215 would be the ColdFusion server software

from Allaire Corporation of Cambridge, MA. A description of the task that the

web server database access module 215 must provide is set forth in Figure 5.

[0066]   Referring to step 510 of Figure 5, an Internet web client that wishes to

access the database 210 authenticates itself as an entity authorized to access

the database. A detailed description of such an authentication process is

described in commonly assigned U.S. Patent application no. 08/966,988 entitled

"Method and System for Secure Lightweight Transactions in Wireless Data

Networks" by Hanqing Liao et al, which is hereby incorporated by reference in its

entirety. Then, at step 520, the web client sends a database request to the web

server database access module 215 of Figure 2. The request may specify the

request of data, the storage of data, or any other typical database function. In

the embodiment of Figure 2, the request may be formatted as a POST request in

HTTP. The web server database access module 215 then processes the request

at step 530 to generate a properly formatted database request. In a preferred

embodiment, the web server database access module 215 creates an SQL

database request. Next, the web server database access module 215 sends the

SQL database request to the database module 212 at step 540.

[0067]   The database 210 processes the request and provides a response back

to the web server database access module at step 550. The database request

may be any database operation such as fetching or storing data. Then, at step

560, web server database access module 215 formats the response received

25

from the database module 212 into a response for the web client. In the

preferred embodiment, the received information is formatted into an HTML web

page. The HTML formatted response is then sent back to the web client across

the Internet. In the preferred embodiment, the web server database access

module sends the formatted HTML web page to the wireless client device using

HTTP. At step 570, the web client displays the formatted response from web

server database access module 215. The response may be information that was

retrieved from the database module or a status response from a store data

operation.

[0068]   Figure 6A illustrates one possible embodiment of a user interface

displayed on a web client that is accessing the web server database access

module. Referring to Figure 6A, a list of bookmark names with associated URLs

(for web sites) or telephone numbers (for telephone bookmarks) is displayed.

Specifically, the bookmarks listed in Figure 6A are the same bookmarks listed in

Figures 4A and 4B. The web user may select a particular bookmark by selecting

the radio pushbutton next to the desired bookmark.

[0069]   A number of functions for modifying the bookmark list are available to

the web users. For example, a web user may add a web site bookmark or add a

telephone bookmark by selecting icons 611 or 612, respectively. A user may

also add a folder that may contain additional web site bookmarks, telephone

bookmarks, or folders by selecting icon 613. An existing bookmark may be

deleted by selecting the bookmark to be deleted and then selecting the delete

bookmark icon 614. To organize a bookmark list, a web user may move a

bookmark up or down within the current list by selecting the move up icon 615 or the move down icon 616, respectively.

[0070]   Any changes made from a web client will appear in the wireless client device since the same database is accessed. The changes will appear almost immediately since the changes to the database will cause the server 114 to invalidate any cached Cards in the wireless client device that contain the changed information. Similarly, any change made from the wireless client device, such as the addition of a "John" telephone bookmark depicted in Figures 4H through 4L, will appear in the web client view as soon as the web client reloads (or refreshes) the web page such that the database is reaccessed. A view of the refreshed web client view is depicted in Figure 6B.

[0071]   By storing the bookmark information in a database that is accessible using standard Internet HTTP protocol, the bookmark database can be accessed by many other programs instead of just a web browser client. For example, a personal computer system 202 that is coupled to the Internet 104 may use a synchronization program 203 that synchronizes the client data in the client information database 210 with information in a local database. For example, the synchronization program 203 may synchronize the web site bookmarks and telephone bookmarks in the client information database 210 with a personal Information Management program like Microsoft Outlook, Lotus Notes, or Qualcomm's Eudora Planner.   Furthermore, the information could be synchronized with another handheld device such as a PalmPilot.

[0072]   The foregoing has described a method and apparatus for storing

telephone numbers in a unified bookmark database. It is contemplated that

changes and modifications may be made by one of ordinary skill in the art, to the

materials and arrangements of elements of the present invention without

departing from the scope of the invention.